FLUKE®

VR1710

Voltage Quality Recorder

Users Manual

October 2007

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Voltage Quality Recorder

Introduction

The Fluke VR1710 Voltage Quality Recorder (*the Recorder*) records and stores voltage trend data from a working power outlet. Once the logging parameters of the Recorder have been set via Power Log software, the Recorder collects data that can be downloaded to a Personal Computer (PC) for complete analysis. The advanced design ensures accurate recording of all voltage parameters.

Recorder and Power Log features include:

- Configurable recording interval
- Graphical and spreadsheet data summaries
- Min, Max, Average RMS values with time stamps
- Transient waveform recording
- Individual harmonic values and time plots
- Download recorded data to PC via USB cable (supplied)
- Print tables, graphs and comprehensive formatted reports
- View, print and export data

Please refer to the *Power Log Users Manual*, located on the *VR1710 Manual CD,* for more information. The manual provides instruction for installation and use, as well as general instructions for connecting to Fluke power quality instruments.

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Contacting Fluke

To contact Fluke, use one of the following telephone numbers:

- USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-3434-0181
- Singapore: +65-738-5655
- Anywhere in the world: +1-425-446-5500

Visit Fluke's Web site at: www.fluke.com for service and calibration information.

Register the Recorder at: http://register.fluke.com

Safety Information

A Warning identifies conditions and actions that pose hazard(s) to the user; a Caution identifies conditions and actions that may damage the Recorder.

⚠⚠Warning

To avoid electrical shock or personal injury when using the Recorder, follow these guidelines:

- **Read this manual before use and follow all safety instructions.**
- **Use the Recorder only as described in this User Manual or the safety features provided by the Recorder may be impaired.**
- **Use only power outlet plug adapters that are supplied with the Recorder.**
- **Before each use, inspect the Recorder for damage. Look for cracks or missing portions of it and the cables. Do not use if damaged.**
- **The Recorder is for indoor use only.**
- **The Recorder is a direct-plug in unit and must be plugged only in applicable and standard sockets. Distribution circuits must be fused.**
- **If there is reason to believe that safe operation is no longer possible, the Recorder should be disconnected and secured from unintentional reconnection.**
- **The Recorder must be opened only by qualified personnel.**
- **Always unplug the Recorder before cleaning.**

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⚠Caution

To avoid damaging the Recorder, follow these guidelines:

Do not use aromatic hydrocarbons or chlorinated solvents for cleaning. These solutions will react with the plastics used in the Recorder.

Safety and electrical symbols used in this manual and on the Recorder are displayed in Table 1.

Table 1. Symbols

Symbol	Meaning	Symbol	Meaning
⚠	Risk of danger. Important information.		Do not dispose of this product as unsorted waste. Go to Fluke's web site for recycling information.
⚠	Hazardous voltage. Risk of electrical shock.		Double insulated
CE	Conforms to relevant European Union directives.	N10140	Conforms to relevant Australian standards.
C SP US	Conforms to relevant Canadian and US Standards.	**CAT II**	This equipment is designed to protect against transients from energy-consuming equipment supplied from the fixed installation, such as televisions, personal computers, portable tools, and other household appliances.
Li	Lithium Battery Do not mix with the solid waste stream. A qualified recycler or hazardous materials handler should dispose of spent batteries. Contact your authorized Fluke Service Center for recycling information.		

Standard Equipment

The following items ship with the Recorder:

- Voltage Recorder with attached 9 inch (23 cm) power cord
- Set of six IEC female power adapter plugs for worldwide use:
  - Type B- Americas, Central America, Japan
  - Type F- Europe
  - Type G- UK, Ireland, Malaysia, Singapore
  - Type I- Australia
  - Type J- Switzerland
  - Type L- Italy, North Africa
- USB A/B cable, compatible with both USB 1.1 and 2.0 transfer rates.

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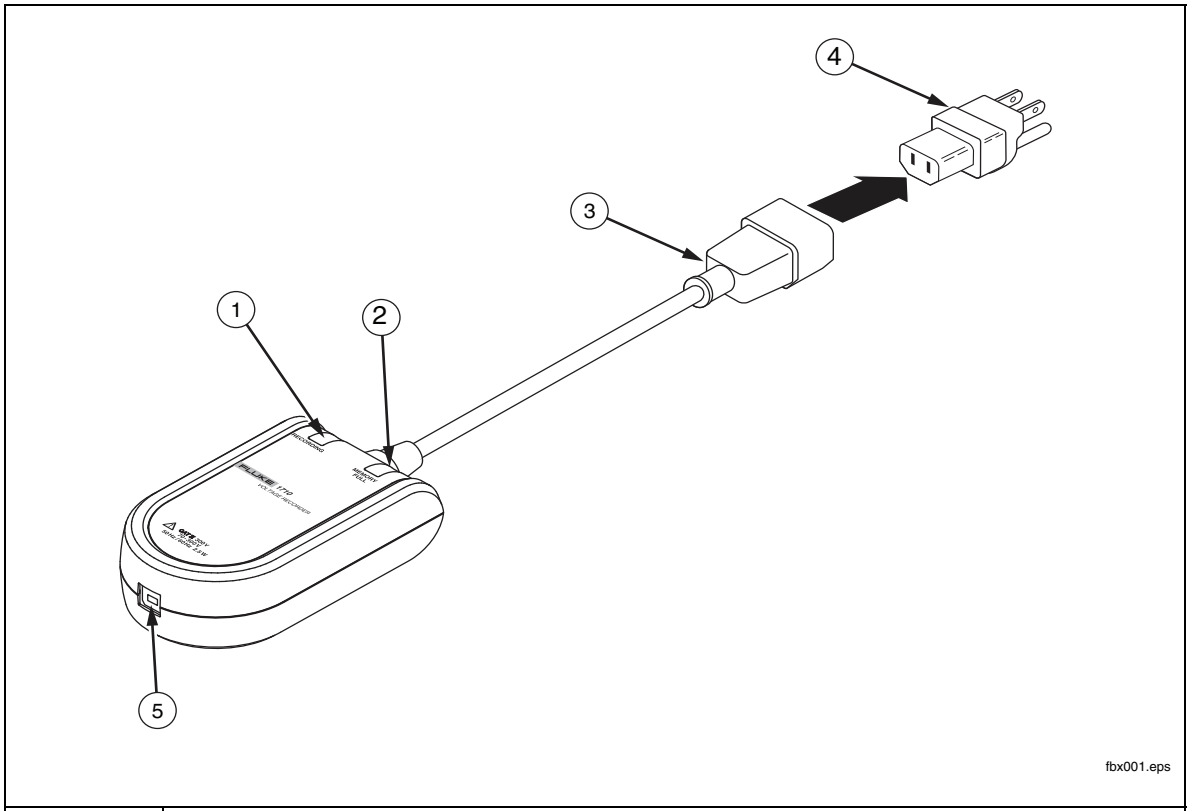
- Product CD including:
  - The *VR1710 Users Manual* (English, French, Italian, German, Spanish, Portuguese, and Simplified Chinese)
  - *Power Log Users Manual*
  - Power Log Software
  - VR1710 USB driver
- Printed multilingual Warranty booklet (same languages as above)
- *Certificate of Calibration Practices*

The Recorder at a Glance

Figure 1 shows the Recorder features.



Number	Description
①	Recording indicator: Flashing- The Recorder is presently recording information Steady- The Recorder has paused and is not recording information
②	Memory full indicator: The Recorder's memory is full and needs to be downloaded before taking more readings
③	Power Cable
④	Adapter Plug (US shown)
⑤	USB Cable port (Type B end)

Figure 1. VR1710 Voltage Quality Recorder

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Using the Recorder

Using the Recorder can be summarized in the following steps:

1. Recorder setup
2. Data collection
3. Downloading and analyzing the data with Power Log

These steps are explained in more detail in the following sections.

Recorder Setup

The Recorder must be set up prior to data collection. The following sections explain the necessary procedures.

Loading Power Log

Before using the Recorder, Power Log software and the VR1710 USB driver need to be loaded onto a PC. The *VR1710 Product CD* contains both items as well as an easy-to-use interface to load the software and manuals to a PC.

For detailed Power Log installation instructions, see *Installing Power Log* in the *Power Log Users Manual* also located on the *VR1710 Product CD*.

Loading the USB Driver

To load the VR1710 USB driver:

1. Run the *VR1710 Product CD* on a PC.
2. Click on **VR1710 USB Driver Installation**.
3. Either select the default directory by clicking on **Install**, or click **Change Install Location…** and change the file path to a different location. The necessary files are copied to the PC.
4. Restart the PC to conclude driver installation.

Setting the Time and Date

When retrieving data from the Recorder, Power Log uses the PC's internal clock for time and date references. It is very important that your PC's time and date are set correctly before running Power Log.

To set your PC's internal clock:

- For Windows XP systems, set the date and time from the Control Panel.
- For non-XP systems, information about setting the date and time can be found in the Windows User's Guide.

Note

If your PC's internal clock switched from daylight savings time to standard time or vice versa during the period that the Recorder is capturing events, you should correct the start time and the end time (if date and time indicated) of the events that occurred up to the time change by adding or subtracting one hour.

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Connecting the Recorder for the First Time

The Recorder plugs into a standard power outlet and connects to a PC via the included USB cable. It should be placed where it can be easily unplugged. Use the proper adapter (included) for your country's power type.

1. Plug the Recorder power cable into the power outlet.

Note

Do not run Power Log until the recorder is installed and the recorder is plugged in and connected to the PC. Power Log will not recognize the Recorder if launched before the Recorder is connected.

2. Connect the Recorder to the PC with the USB cable.
3. When the Recorder is connected to the PC for the first time, Windows finds the Recorder and the Windows **New Hardware Wizard** appears.

To complete installation, follow these steps:

1. Select the **Install the software automatically (Recommended)** option by clicking **Next**.
2. Click **Finish**.

For the latest Recorder firmware, see *Firmware Updates*.

Adjusting Recorder Settings with Power Log

Before using the Recorder to collect data, desired variables must be set in the Recorder with Power Log.

To set these values:

1. Connect the Recorder to the PC.
2. Launch Power Log. Note that the **Select Serial Port** menu shows **Fluke VR1710**. If it is not showing, click the right arrow on the list and scroll down to it. If **Fluke VR1710** does not appear in the list, leave the Recorder connected and close, then re-open Power Log. **Fluke VR1710** should now appear in the list.

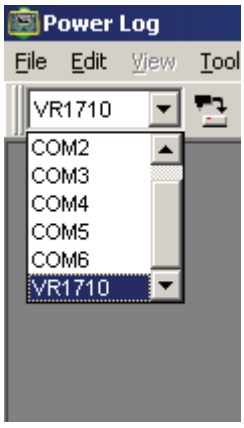

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Figure 2. Power Log Drop Down List

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3. Click on **(VR1710 Settings).**

   From the Settings screen, you can specify the recording interval, dip and swell thresholds for triggering Events, or erase the Recorder's memory.

4. Enter the desired settings and press **Apply**. If **Apply** is not pressed, the Recorder reverts to its previous settings.

   Note

   *Each time that **Settings** is opened, recording data stops and will not restart until the Recorder is plugged in again.*

   The percentage of recording memory used is displayed. An estimate of recording time is shown under **Typical Continuous Measurement**. This shows the total amount of time the Recorder can collect data. If transients are detected, the strored waveforms will shorten the maximum recording time.

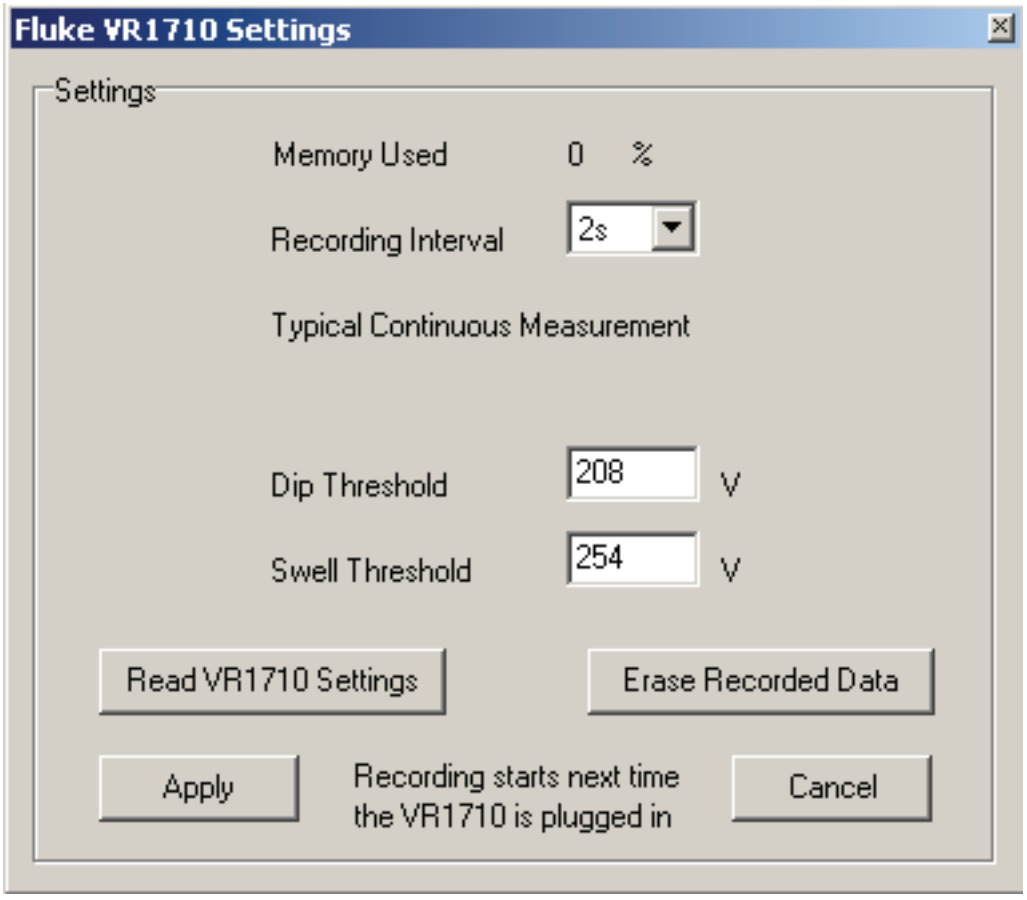

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Figure 3. Settings

Notes

When choosing recording intervals, note that shorter recording intervals may mean a shorter period of data is taken before the Recorder storage is exhausted, but shorter recording periods result in richer data than if longer periods are used.

5. Once the settings are correct, click **Apply**.

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6. Close **Settings** and disconnect the Recorder from the PC.

Data Collection

The Recorder is now ready to collect data. Plug the Recorder into a standard power outlet and it will start recording data based on the settings established in *Recorder Setup*.

Leave the Recorder plugged in for a few hours or days depending on your application. When you are ready or the Recorder memory becomes full, disconnect it from the power outlet and connect it to a PC running Power Log.

Electric utility specialists can also send the Recorder to a utility consumer who can connect it to their own electric outlet for a specified period. When finished taking data, the consumer can then send the Recorder back to the electric utility specialist. The specialist can analyze the collected data with Power Log software.

Settings, collected data, and real-time clock data stay intact in transit via the Recorder's non-volatile memory.

Downloading and Analyzing the Data with Power Log

To download the data from the Recorder, open Power Log and click (**Data Download**).

Recorder data is downloaded to the PC. Power Log asks if you wish to keep measuring data and presents three options:

- Keep measuring (**Yes**)
- Stop measuring (**No**)
- Keep measuring but erase the Recorder memory up to the point of data download (**Yes, and Erase memory**).
  Note that all prior measurement data will be lost, so make sure to save the data in Power Log before exiting.

For in depth information on data analysis see *Analyzing Data* in the *Power Log Users Manual* on the Product CD.

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Maintenance

The Recorder is maintenance-free. Keep it clean to allow for easy visual inspections. To clean the Recorder, unplug it from the outlet and wipe it with a dry, clean cloth.

⚠Caution

To avoid damaging the Recorder, do not use aromatic hydrocarbons or chlorinated solvents for cleaning. These solutions will react with and damage the plastics used in the Recorder.

Note

A non-replaceable, rechargeable Lithium Battery powers the Recorder clock.

Do not mix with the solid waste stream. A qualified recycler or hazardous materials handler should dispose of spent batteries.

Contact your authorized Fluke Service Center for recycling information.

Service

The Recorder contains no user-serviceable parts. Opening the case, or attempting to do so, will void the warranty and safety certification. The USB Cable is the only replacement part in the VR1710 package. If service or calibration is required, please contact a local dealer or an authorized Fluke service center (see *Contacting Fluke*).

Software Updates

Fluke may periodically offer software and internal firmware updates for the Recorder. To download the latest Power Log software or firmware, please visit the Support page at www.fluke.com.

Specifications

Electrical Specifications

RMS voltage channels	2
RMS voltage measurement range	70 V to 300 V
RMS voltage resolution	0.125 V
RMS voltage uncertainty	±0.5 % of range (300 V)
Measuring method	True RMS
Sampling frequency	32 kHz
Frequency range	50 ±1 Hz, 60 ±1 Hz
Frequency uncertainty	±0.02 Hz
Transient recording resolution	12 bit
Harmonic amplitude uncertainty	±0.1 % relative to fundamental RMS value
Maximum harmonics recording order	50th

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General Specifications

Internal memory capacity	More than 3 months under normal conditions
Communication	USB 1.1 and 2.0
Internal clock error	< 1 second/month
Power consumption	2.5 W
Power requirements	70 V to 300 V
Size (H x W x L)	1.5 x 3 x 5.2 in. (39 x 77 x 134 mm)
Weight	0.45 lb (.207 kg)

Environmental and Safety Specifications

Operating altitude	2000 m
IP rating	40, indoor use only
Vibration requirements	Class 2, MIL-PRF-28800F
Drop test requirements	1 m
Operating temperature	14 °F to 122 °F (-10 °C to 50 °C)
Storage temperature	-4 °F to 140 °F (-20 ºC to 60 ºC)
Operating humidity (without condensation)	32 °F to 86 °F (0 °C to 30 °C) Max 95 % RH 86 °F to 104 °F (30 °C to 40 °C) Max 75 % RH 104 °F to 122 °F (40 °C to 50 °C) Max 45 % RH
Measurement category rating	300V CAT II, Pollution degree II
Safety	IEC 61010-1
EMC	IEC 61326-1

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